**UNIT 5:** Congruence, Proof, and Constructions

**Experiment with transformations in the plane.**

*Standard G.CO.5:* Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

***Develop Understanding Lesson***

**Glencoe Geometry Book:** p. 462: WHAT IS HAPPENING? LET’S DO IT AGAIN!! Describe how you go from one figure to the next. Using the same process draw a third figure. Justify your outcome. *Work individually and then compare in groups.* Use this activity to take a specific example when students put their work up on board and to explain that every rotation is a composition of two reflections. Rigid and non-rigid.

Develop a task that will allow students to model transformations using coordinate points, function notations, matrices and written and verbal explanations. Reflect across y=x, as well as the origin and x-and y-axes.

* Surface ideas such as…
  + *There are transformations that are rigid and non-rigid and know what these translations are (the vocabulary by making observations, conjectures and relating to the real-world).*
  + *Being able to justify the congruence of two figures using properties of rigid motions and also understanding that the non-rigid translations do not result in congruent figures.*
  + *We can map transformations on a coordinate plane and use exact coordinates, areas, distances, angles.*
  + *Transformations can be described as functions that take points in the plane as inputs and give other points as outputs.*
  + *Certain translations will carry a shape (rectangle, parallelogram, trapezoid, or regular polygon) onto itself.*
  + *Defining rotations, reflections, and translations using angles, circles, perpendicular lines, parallel lines, and line segments.*
  + *Drawing rotations, reflections, and translations and perform them using a variety of methods.*
  + *Identifying the sequence of transformations that will carry a given figure to another*
  + *Matrices can be used to map transformations*
* Invent strategies to…
  + *Organize (tables?) and map one figure to the next (matrices).*
  + *Create transformations*
  + *Forming predictions, generalizations and theories based on activities.*
  + *Determine which transformations will preserve attributes such as perimeter, area, segment length, and angle measure and which will not.*
* Create representations that…
  + *Show the mapping of one figure to the next. (matrices, equations, illustrations, etc.)*

**Solidify Understanding Lesson**

* the idea that…
  + *Rigid tranformations are the result of translations and reflections and non-rigid transformations are the result of dilations.*
  + *There is more than one type of transformation that will create a mapping of the object.*
* The strategy for…
  + *Generating a matrix to show transformations.*
  + *Communicating how the transformations are applied.*
  + *Applying all of these to lines or other functions*
* The representation…
  + *of seeing the pictures*

**Practice Understanding Lesson**

* the definition of…
* billiards, marching bands, amusement park rides
* have students make groups and form triangles, etc and have to rotate, reflect,
* use the wall in your classroom
* observations (a free app on ipad)
* a car driving…it just moves…doesn’t change, still a car
* gas gage for a rotation
* chess
* car logos-pull them up and do a display. How does it transform? P. 156 Prentice Hall Geometry
* take cameras and take pictures of different kinds of transformations…put together a display?...extra credit
* Tessellations?
* Simply Find It ipad app

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[www.zamzar.com](http://www.zamzar.com)

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